to federate, existing institutions of academic rank, is the only real solution of the problem. An academic body of this character might well be organized, so far as teaching is concerned, on the broad lines of a Scottish University. Such a corporation may be conveniently spoken of as a *professorial University*, to distinguish it from a federal University. A federal University may be all that is possible when the constituent Colleges are situated in different towns, as is the case in the Victoria University; but it cannot be efficient in London, where these Colleges would appeal to the same public for support.

The scheme put forward by the Association for Promoting a Professorial University for London is not open to the objections urged against the Gresham scheme. It would found a University on the same broad lines as those of France, Germany, and Switzerland. It would bring to the new University all the power and prestige of the existing University. It will meet with no opposition from the provincial Colleges; on the contrary, it has the active support of many of the leading provincial teachers. It satisfies the demands of the Victoria University that the medical degree shall carry the license to practise, and that the medical representation shall not preponderate. It has, for the first time in the history of the movement, brought the most influential teachers from a variety of London teaching bodies into close and active sympathy, and animated them with a desire for a University of definite type. It is significant that the Council and staff of Bedford College are at one in favour of a University on the general lines laid down in the Association scheme. The Senate of University College has carried a motion urging their Council to adopt a similar resolution in favour of the scheme of absorption. The Association scheme makes full provision for the recognition of work of the University Extension character, and for the appointment of University lecturers at minor and non-absorbed teaching institutions. Whilst proposing central control and central University laboratories of the highest type, it provides for local teaching such as is required for pass degrees or for the lower stages of honours graduation. Lastly, it provides for post-graduation courses and specialized instruction, such as that of the Collège de France and of the greater German Universities.

As regards medicine, it recognizes that it is impossible to "absorb" the medical schools owing to their close relation to great public charities; but at the same time it endeavours to grant much of what the Medical Faculty gained by the Gresham Charter. The Medical Faculty will be elected by the medical teachers themselves. There will be, as in every University of standing, medical professors appointed by the Senate from the Medical Faculty on the recommendation of the faculty. The existence of such a medical professoriate will enhance the dignity of the University and of the medical schools, whilst at the same time it holds out a strong inducement to those schools to select members for the Medical Faculty on the ground of their scientific as well as their administrative reputation. The limitation of the number of medical professors on the Senate will safeguard the character of the medical degree. The scheme, whilst giving very extended powers to the medical schools, meets the objections of the provincial opponents of the Gresham Charter. Lastly, it provides for the due University recognition of the pure science teaching of the medical schools.

We have thus indicated as shortly as possible the main features of the two schemes which are at present before us. The one is essentially parochial in its conception, and vestry-like in its character. The other has in it the elements of a great teaching organization which shall be both metropolitan and imperial in its aims and influence—a University which shall be worthy of London, the capital alike of Great Britain and of the Greater Britain beyond the seas.

THE ANALYSIS OF WINES.

Analyse des Vins. Par le Dr. L. Magnier de la Source. (Paris: Gauthier-Villars et Fils, 1892.)

ALTHOUGH wine is gradually becoming more and more important as an item in the national drink-bill—last year we imported 16,782,038 gallons, valued at £5,995,133—its analysis and the methods for the detection of its sophistication have received comparatively little attention from the chemists of this country. On the other hand, in France and Germany the subject has been very thoroughly investigated in practically all its many details, and carefully worked-out methods have been prescribed for the guidance of the public analysts of those countries. Indeed, there is probably no article of food or drink, with the possible exception of milk, of which the chemistry has been so well thrashed out. Wine is in reality a highly complex fluid, and on account of the character of certain of its proximate constituents it is frequently liable to change. It contains various alcohols, glycerin, acids, salts, "extractive matter," together with those principles which give to it its particular colour, special flavour, smell, or "bouquet." Whilst some of these constituents can be accurately isolated and described, others can only be detected by the sense of smell. The principal alcohol is, of course, ethyl alcohol, but butyl and amyl alcohols, together with ethylene glycol and isobutyl glycol are not unfrequently present in greater or less quantity. The quantity of alcohol in natural wines may be said to vary from 6 to 12 per cent., and the quantity of glycerin from 7 to 10 per cent. of the alcohol present. Tartaric, malic, succinic, glycollic, and oxalic, together with tannic and acetic, are the chief acids in wine. These are said to aid in its preservation, by preventing the formation of fungi. Traces of other fatty acids, such as propionic, butyric, and œnanthic acids are also present, as well as acetaldehyde, and possibly its homologues. Tartaric acid occurs mainly as the dextro variety: lævo-tartaric acid is only of comparatively infrequent occurrence. If tartaric acid is not found, as, for example, in certain samples of sherry, its absence is almost certainly due to its removal by "plastering." The amount of free acid in sound wine, reckoned as tartaric acid, varies between 0·3 and 0·7 per cent.; a greater amount than this imparts sourness to the wine.

Old wines have an acid reaction in consequence of the presence of a certain amount of free acid and potassium bitartrate. A wine not exhibiting this acid reaction tastes flat; the acidity is its most important flavour. For a long time it has been believed that the free acid of wine is tartaric acid alone. Nessler's researches have, however, shown that this is seldom the case; tartaric and malic acids often exist together, and frequently the free acid consists of malic acid entirely. Wines containing tartaric acid taste more tart than those with only malic acid, or a mixture of malic and tartaric acids.

The characteristic smell of wine is said to be due to œnanthic ether; the compound ethers probably confer the bouquets which distinguish one vintage from another: among these are aceto-propylic, butylic, amylic, caprylic, butyro-ethylic, caprylo-ethylic, capro-ethylic, and pelargo-ethylic, and the tartaric ethers. According to Jacquemin, these bouquets are primarily due to the special characters of the yeast used in the several districts. One and the same "must" fermented with the yeast obtained from several different districts gave wines having the bouquet characteristic of the district from which the particular yeast had come. Rommer fermented the juice of an inferior grape and of hot-house grapes respectively with yeast cultures obtained from the Champagne, Côte d'Or, and Buxy districts, and found that in each case the wines had the bouquet of those from which the yeast had been derived. The sugars occurring in wine are dextrose and lævulose. Cane-sugar is never naturally present, even in "must"; it is sometimes added, as in the case of champagne, but it is then rapidly transformed into invert sugar. In some wines, as, *e.g.*, Sauternes and sweet Rhine wines, sugar occurs in the form of inosite. The colouring-matter of normal wine is derived partly from the oxidation of the so-called extractives contained in the juice, and in the case of red wines from matter (œnolin or œnotannin) contained in the husks, stalks, and seeds, which is soluble only by the joint action of acid and the alcohol formed during fermentation. The albuminous substances in the "must" are removed when the fermentation is properly carried out, but in imperfectly fermented wines a certain amount remains, and in the case of white wines may again render them liable to fresh fermentation. In red wines this danger is obviated by the presence of the tannin of the husks.

The inorganic substances contained in wine are potash, soda, lime, and magnesia, in combination mainly with tartaric, phosphoric, and hydrochloric acids. Sherries contain potassium sulphate in excess, owing to the practice of adding gypsum to the "must." This practice, which prevails not only in Spain, but also in Portugal, the south of France, and to some extent in Italy, probably has for its object the precipitation of certain albuminous matters which injuriously affect the wine. It is alleged that the fermentation is in consequence much more rapid and complete, that the wine keeps longer, and that its colour is richer and more lasting. Its real advantage to the wine-maker is that it clarifies the wine rapidly, and allows it to be quickly brought to market. It is chiefly employed with the coarser qualities of red wine, and the gypsum is either added to the grapes and trodden with them, or, in fewer cases, added to the expressed juice; the quantity used is generally 1 to 2 kilos to every 100 kilos of fruit, but it is some times as much as 10 kilos. The action of the calcium sulphate on the bitartrate of potash present in the juice produces an acid sulphate of potash, which gradually forms the normal salt by decomposition of the phosphate present forming free phosphoric acid. Hence a "plastered" wine is relatively rich in potash and sulphuric acid.

Although much has been said as to the baneful effects of plastered wine, very few trustworthy cases of injurious action have been recorded. The Academy of Medicine of Limoges instituted a lengthened inquiry on the subject in 1888, and reported unfavourably on the effects of plastered wine upon health. The French War Department also appointed a Commission, and its conclusions, which, on the whole, were unfavourable to the practice, have been recently confirmed by Nencki, who was requested by the Government of the Canton Berne to report on the advisability of modifying a law, which operates in many parts of the Continent, forbidding the sale of wines containing more than 2 grams of potassium sulphate to the litre. As to the question whether a plastered wine should be called adulterated, it has been contended that a product which, by treatment, is deprived of one of its most characteristic constituents, viz. tartaric acid, whilst another substance, calcium sulphate, not normally present, is introduced, cannot be called anything but adulterated.

As may be supposed, the art of the falsifier is very largely directed to the improvement of the colour of wine; and unfortunately it is upon the product which popular prejudice associates with the name of an eminent statesman, and which has no other attribute of claret than its colour, that his skill is mainly expended. It has been estimated that the whole yield of the "classed growths" of the Médoc does not, even in the best years, now exceed 5,000,000 bottles. Much of this, it is true, comes to England, but enormous quantities of *paysan*, *artisan*, and *bourgeois* wines from the Gironde and Languedoc, mixed with the produce of North Spain and Italy, are worked up and sold as "claret" in this country. This product is not exactly poisonous, nor even, as a rule, positively hurtful, but, it need hardly be said, it has no special merit or individuality. Formerly, the pharmacopœia of the wine-doctor, like that of the physician of old, was restricted to products of the vegetable kingdom; but, in addition to the colouring-matter of *Phytolacca* berries, *Althæa rosea*, bilberries, mallow, elderberries, privet-berries, logwood, alkanna red, lichen reds, all of which are still used to a greater or less extent, he has not been unmindful of the wealth of colouring-matter which is latent in coal-tar; and to-day the banks of the Rhine have their part in the manufacture of other wines than hock. Biebrich scarlet, fuchsine (magenta), the various Ponceaus, Bordeaux reds, crocein scarlet, and similar colouring-matters, find their way to the south of Europe for the purpose of wine sophistication. A substance known as *tintura per los vinos* is largely used in the district of Huesca for colouring Spanish wines. It contains two coal-tar derivatives, one of which is that form of Biebrich red which is turned blue by sulphuric acid, whilst the other, which exists in smaller proportion, closely resembles the colouring matter known as *cerise.* According to an analysis by Jay, the composition of *tintura* is: organic matter, mainly Biebrich red, 66·4; sodium sulphate, 26·10; arsenious oxide, 1·62; iron oxide, lime, &c., 5·88. In view of the peculiar nature of this substance, it is reassuring to know that there is a tendency to return to vegetable colouring-matters, and that large quantities of maqui berries are being imported into Europe from Chili for the purpose of colouring wines. In the three years ending 1887 the exports of this substance were respectively 26,592, 136,026, and 431,392 kilos, by far the largest proportion finding its way to France.

The little book before us has no pretensions to be regarded as a complete treatise on the analysis of wines. Its aim is to furnish the analyst with a number of carefully tested methods for the detection of sophistications and adulterations, and for the rapid determination of those constituents on which the character of wine mainly depends. Dr. Magnier de la Source is well known in France as an authority on the subject, and the *Bulletin* of the French Chemical Society contains papers by him relating to the analysis of wine. His methods are, for the most part, similar to those adopted by the Association of German and Austrian analysts, although they are not described with that minute attention to detail which has been found desirable by the German-speaking chemists. As may be seen on turning over the pages of Fresenius's *Zeitschrift für analytische Chemie*, the "musts" and wines of Germany are periodically examined and reported upon with all the method and regularity adopted in the case of the London water-supply; and it has happened in the past that the modes of determining such constituents as the vegetable acids, glycerin, and "extractive matters" have been discussed and wrangled over in a manner which recalls the famous fights over "organic carbon," "albuminoid ammonia," and "previous sewage contamination" of years ago. The only fault that we have to find with this book is that its author hardly does justice to his German brethren; although, it is but fair to add, some reference to their work is to be found in the excellent bibliography at the end of the volume. T. E. T.

MODERN THERAPEUTICS.

An Introduction to Modern Therapeutics. By T. Lauder Brunton, M.D., &c. (London: Macmillan and Co., 1892.)

THIS work is a reprint of the Croonian Lectures delivered before the Royal College of Physicians, London, in 1889. Whatever Dr. Brunton writes is sure to be interesting, and the present lectures have lost none of their lucidity or freshness though three years have elapsed since they were before the medical profession. It is hardly necessary to say that the subject is one with which Dr. Lauder Brunton is eminently fitted to deal, and the non-medical reader will be convinced when he has read the volume that medicine and therapeutics are far from being the inexact sciences they were not many years ago. The elementary nature of some of the early pages will be understood when it is remembered that the audience before which the lectures were originally given consisted in a large measure of men who had learnt chemistry before the days of Crookes, Lockyer, and Mendeleeff. It was necessary that the author should lead them through a brief survey of the chief facts and theories relating to atoms and molecules until the more difficult subject of the composition, constitution, and methods of union of organic radicles is reached. This is done in an admirably clear summary, assisted by those apt illustrations drawn from every-day life for which Dr. Brunton is so well-known. Our new drngs are now made by the chemist; so great has been the advance of organic chemistry, that the pharmacologist has hard work to keep pace with all the new combinations that issue from the laboratory. But the two classes of investigators, the chemists and the experimental therapeutists, have at least gone hand in hand so far, that it is now possible to judge the action of a drug by its composition. This, however, as Dr. Brunton points out, is not a rule without exception. There are many drugs which behave in unexpected ways; they no doubt, in the future, will be brought into harmony with laws of nature yet to be discovered. At present it is not possible to prophesy the physiological action of a chemical compound with that mathematical accuracy which enables astronomers to foretell eclipses; pharmacology is yet, and perhaps always will be, an experimental science.

The lectures stand practically in the same condition as that in which they were delivered. A volume of equal size to that under consideration would have been necessary to include all the new work that has appeared in the last few years. The tuberculin of Koch; the importance of poisonous proteids, and the diminishing popularity of the ptomaines; the action of the intestinal epithelium (*vice* the liver) as the gatekeeper protecting the body from the entrance of albumose; the application of phagocytosis to the problems of disease, together with the views of the antiphagocytists—these are a few of the big questions that have come to the fore in the last three years, and it is only active pathologists who would be able to realize how much longer these lectures would have been if full reference had been made to all of them. The main facts, and the principal conclusions adduced by Dr. Brunton, will, however, still remain; and all those who read the lectures in the medical journals before will welcome their appearance in a more permanent form now, and to those who missed them in 1889 we can confidently recommend the book as one which will not only be interesting but also useful. W. D. H.

OUR BOOK SHELF.

Elementary Hydrostatics. By W. H. Besant, Sc.D., F.R.S. "Cambridge Mathematical Series." (Cambridge: Deighton, Bell, and Co., 1892.)

THE success this work has achieved will be gathered from the fact that this is the fifteenth edition, so that any further criticism on our part would be quite unnecessary. The brief snatches of historical matter, together with the lucid and simple explanations, all tend to stir up in the student an amount of interest which in the reading of many other works on this subject lies dormant. By a careful study of the illustrations, especially those relating to pumps, presses, &c., the beginner may gather much knowledge about the principles on which they are based. In this edition the text has undergone a careful revision, several alterations and additions having been made. A uniform system of units has been maintained throughout, and the chapters on the motions of fluids and on sound, which in previous editions were inserted among those on the equilibrium of fluids, have here been separated. The examples and problems at the termination of each chapter are as numerous as ever, a new edition of